

GS1 Series Introduction



GS1 Series Drives					
Motor Rating	Hp	.25	.5	1	2
	kW	0.2	0.4	0.75	1.5
115 Volt Single-Phase Input/230 Volt Three-Phase Output		✓	✓		
230 Volt Single-Phase Input/230 Volt Three-Phase Output		✓	✓	✓	
230 Volt Three-Phase Input/Output					✓

Overview

The GS1 series of AC drives is our most affordable and compact inverter, offering V/Hz control with general purpose application features. These drives can be configured using the built-in digital keypad (which also allows you to set the drive speed, start and stop, and monitor specific parameters) or with the standard RS-485 serial communications port. Standard GS1 features include one analog input, four programmable digital inputs and one programmable normally open relay output.

Features

- Simple Volts/Hertz control
- Pulse Width Modulation (PWM)
- 3 - 10 kHz carrier frequency
- IGBT technology
- 130% starting torque at 5Hz
- 150% rated current for one minute
- Electronic overload protection
- Stall prevention
- Adjustable accel and decel ramps
- S-curve settings for acceleration and deceleration
- Automatic torque compensation
- Automatic slip compensation
- DC braking
- Built-in EMI filter
- Three skip frequencies
- Trip history
- Integral keypad and speed potentiometer
- Programmable jog speed
- Three programmable preset speeds
- Four programmable digital inputs
- One programmable analog input
- One programmable relay output
- RS-485 Modbus communications up to 19.2K
- Optional Ethernet communications
- UL/cUL/CE listed

Accessories

- AC line reactors
- RF filter
- Ethernet interface
- Four and eight port RS-485 multi-drop termination board
- KEPDirect I/O Server
- GSoft drive configuration software
- GS-485HD15-CBL - ZIPLink RS485 Communication cable for connection to the DL06 and D2-260 15-pin ports.

Detailed descriptions and specifications for the accessories are available in the "GS/DURApulse Accessories" section.

Typical Applications

- Conveyors
- Fans
- Pumps
- Shop tools

GS1 series part numbering system

GS1 - 2 0P5

Applicable Motor Capacity

0P2: 1/4hp 0P5: 1/2hp
1P0: 1hp 2P0: 2hp

Input Voltage

1: 100-120VAC
2: 200-240VAC

Series Name

GS1 Series Specifications

115V/230V CLASS GS1 Series							
Model		GS1-10P2	GS1-10P5	GS1-20P2	GS1-20P5	GS1-21P0	GS1-22P0
Price		<--->	<--->	<--->	<--->	<--->	<--->
Motor Rating	HP	1/4 hp	1/2 hp	1/4 hp	1/2 hp	1hp	2hp
	kW	0.2 kW	0.4 kW	0.2 kW	0.4 kW	0.7 kW	1.5 kW
Rated Output Capacity (200V) kVA		0.6	1.0	0.6	1.0	1.6	2.7
Rated Input Voltage		Single-phase 100-120 VAC ±10%, 50/60 Hz ±5%		Single/three-phase: 200-240 VAC±10%, 50/60 Hz ±5%			Three-phase: 200-240 VAC±10%, 50/60 Hz ±5%
Rated Output Voltage		Three-phase corresponds to double the input voltage		Three-phase corresponds to the input voltage			
Rated Input Current (A)		6	9	4.9/1.9	6.5/2.7	9.7/5.1	9
Rated Output Current (A)		1.6	2.5	1.6	2.5	4.2	7.0
Watt Loss 100% (I)		19.2	19.2	18.4	26.8	44.6	73
Weight: kg (lb)		2.10	2.20	2.20	2.20	2.20	2.20
Dimensions (HxWxD) mm (in)		132.0 x 68.0 x128.1 (5.20 x 2.68 x 5.04)					
Accessories							
Ethernet Communications module for GS Series Drives (DIN rail mounted)		GS-EDRV					
Four port RS-485 multi-drop termination board		GS-RS485-4					
Eight port RS-485 multi-drop termination board		GS-RS485-8					
Software		GSoft / KEP <i>Direct</i>					
OPC Server		KEP <i>Direct</i>					

GS1 General Specifications

General Specifications			
Control Characteristics			
Control System		Sinusoidal Pulse Width Modulation, carrier frequency 3kHz - 10kHz	
Rated Output Frequency		1.0 to 400.0 Hz limited to 9999 motor rpm	
Output Frequency Resolution		0.1 Hz	
Overload Capacity		150% of rated current for 1 minute	
Torque Characteristics		Includes auto-torque, auto-slip compensation, starting torque 130% @ 5.0Hz	
DC Braking		Operation frequency 60-0Hz, 0-30% rated voltage. Start time 0.0-5.0 seconds. Stop time 0.0-25.0 seconds	
Acceleration/Deceleration Time		0.1 to 600 seconds (can be set individually)	
Voltage/Frequency Pattern		V/F pattern adjustable. Settings available for Constant Torque - low and high starting torque, Variable Torque - low and high starting torque, and user configured	
Stall Prevention Level		20 to 200% or rated current	
Operation Specification			
Inputs	Frequency Setting	Keypad	Setting by <UP> or <DOWN> buttons or potentiometer
		External Signal	Potentiometer - 5k Ω 0.5W, 0 to 10 VDC (input impedance 47k Ω), 0 to 20 mA / 4 to 20 mA (input impedance 250 Ω), Multi-function inputs 1 to 3 (3 steps, JOG, UP/DOWN command), RS485 communication setting
	Operation Setting	Keypad	Setting by <RUN>, <STOP> buttons
		External Signal	DI1, DI2, DI3, DI4 can be combined to offer various modes of operation, RS485 communication port
Outputs	Multi-Function Input Signal		Multi-step selection 0 to 3, Jog, Accel/decel inhibit, First/second accel/decel switch, Counter, PLC operation, External base block (N.C., N.O.) selection
	Multi-Function Output Signal		AC drive operating, Frequency attained, Non zero speed, Base Block, Fault indication, Local/remote indication, PLC operation indication
	Operating Functions		Automatic voltage regulation, S-curve, Over-voltage stall prevention, DC braking, Fault records, Adjustable carried frequency, Starting frequency setting of DC braking, Over-current stall prevention, Momentary power loss restart, Reverse inhibition, Frequency limits, Parameter lock/reset
Protective Functions		Overcurrent, overvoltage, undervoltage, electronic thermal motor overload, Overheating, Overload, Self testing	
Operator Interface	Operator Devices		5-key, 4-digit, 7-segment LED, 3 status LEDs, potentiometer
	Programming		Parameter values for setup and review, fault codes
	Parameter Monitor		Master Frequency, Output Frequency, Scaled Output Frequency, Output Voltage, DC Bus Voltage, Output Direction, Trip Event Monitor, Trip History Monitor
	Key Functions		RUN/STOP, DISPLAY/RESET, PROGRAM/ENTER, <UP>, <DOWN>
Environment	Enclosure Rating		Protected chassis, IP20
	Ambient Operating Temperature		-10° to 40°C (14°F to 104°F) w/o derating
	Storage Temperature		-20° to 60 °C (-4°F to 140°F) during short-term transportation period)
	Ambient Humidity		0 to 90% RH (non-condensing)
	Vibration		9.8 m/s²(1G), less than 10Hz. 5.88 m/s² (0.6G) 20 to 50 Hz
	Installation Location		Altitude 1000m or lower above sea level, keep from corrosive gas, liquid and dust
Options		Programming Software (GSOFT)	

GS1 Specifications - Installation

Understanding the installation requirements for your GS1 drive will help to ensure that it will operate within its environmental and electrical limits.

NOTE:

Never use only this catalog for installation instructions or operation of equipment; refer to the user manual, GS1-M.

Environmental Specifications	
Protective Structure	IP20
Ambient Operating Temperature²	-10 to 40°C
Storage Temperature³	-20 to 60°C
Humidity	to 90% (no condensation)
Vibration⁴	5.9 m/S ² (0.6G), 10 to 55 Hz
Location	Altitude 1,000 m or less, indoors (no corrosive gases or dust)

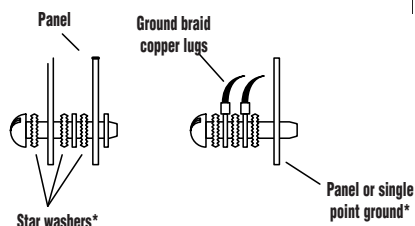
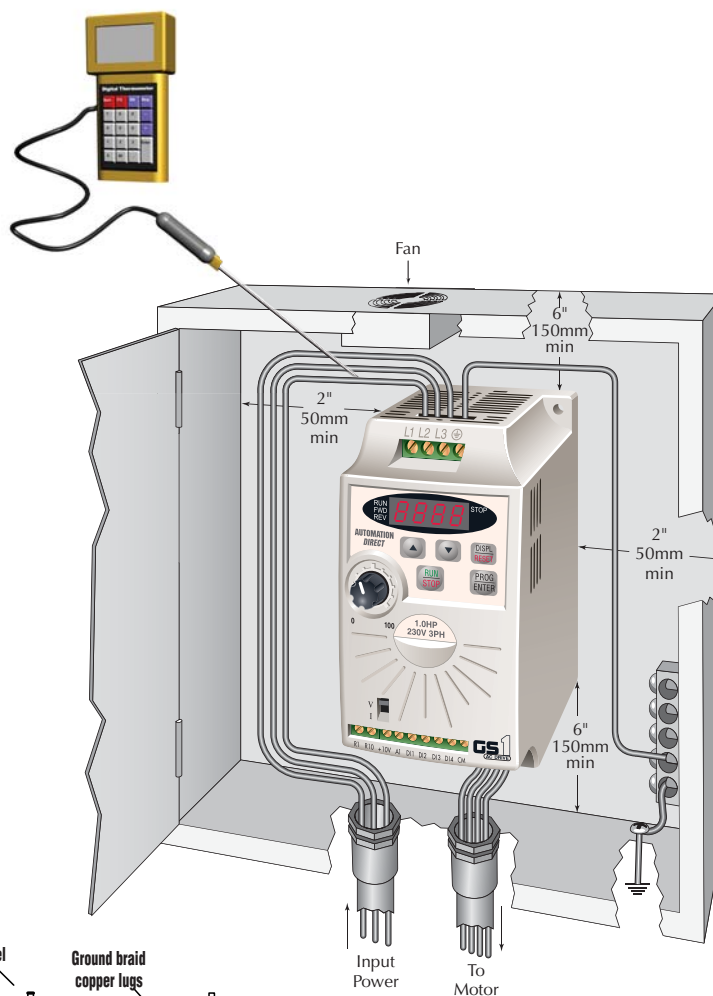
1: Protective structure is based upon EN60529

2: The ambient temperature must be in the range of -10° to 40° C. If the range will be up to 50° C, you will need to set the carrier frequency to 2.1 kHz or less and derate the output current to 80% or less. See our Web site for derating curves.

3: The storage temperature refers to the short-term temperature during transport.

4: Conforms to the test method specified in JIS C0911 (1984)

Watt-loss Chart	
GS1 Drive Model	At full load
GS1-10P2	19.2
GS1-10P5	19.2
GS1-20P2	18.4
GS1-20P5	26.8
GS1-21P0	44.6
GS1-22P0	73



*** FOR PAINTED SUB-PANELS,
SCRAPE THE PAINT FROM UNDER-
NEATH THE STAR WASHERS
BEFORE TIGHTENING THEM.**



Warning: AC drives generate a large amount of heat, which may damage the AC drive. Auxiliary cooling methods are typically required in order to not exceed maximum ambient temperatures.

Company
Info.

PLCs

Field I/O

Software

C-more &
other HMI

AC Drives

AC Motors

Power
Transmiss.

Steppers/
Servos

Motor
Controls

Proximity
Sensors

Photo
Sensors

Limit
Switches

Encoders

Current
Sensors

Pressure
Sensors

Temp.
Sensors

Pushbuttons/
Lights

Process

Relays/
Timers

Comm.

Terminal
Blocks &
Wiring

Power

Circuit
Protection

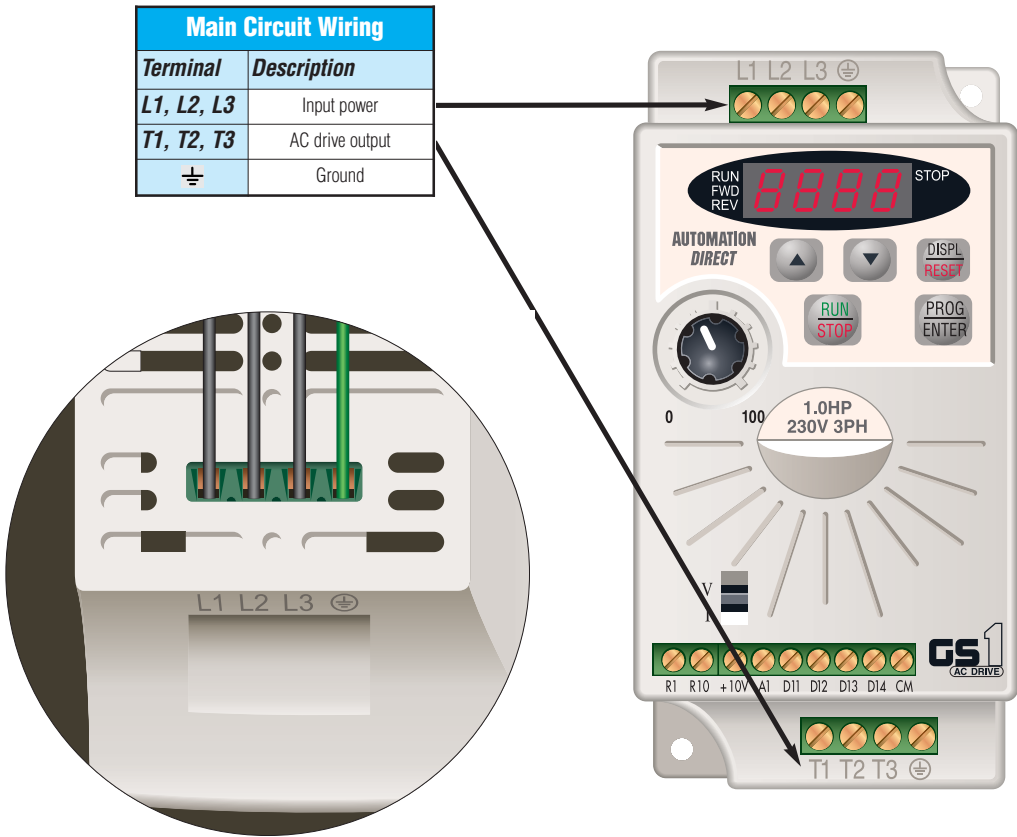
Enclosures

Tools

Appendix

Part Index

GS1 Specifications - Terminals



Control Circuit Terminals	
Terminal Symbol	Description
R10	Relay output 1 normally open
R1	Relay output 1 common
DI1	Digital input 1
DI2	Digital input 2
DI3	Digital input 3
DI4	Digital input 4
AI ¹	Analog input
+10V	Internal power supply (10 mA @ 10 VDC)
CM	Common

¹ 0 to +10 VDC, 0 to 20 mA, or 4 to 20 mA input represents zero to maximum output frequency.

Note: Use twisted-shielded, twisted-pair or shielded-lead wires for the control signal wiring. It is recommended all signal wiring be run in a separate steel conduit. The shield wire should only be connected at the drive. Do not connect shield wire on both ends.

GS1 Specifications - Basic Wiring Diagram

Note: Users **MUST** connect wiring according to the circuit diagram shown below. (Refer to user manual GS1-M for additional specific wiring information.)

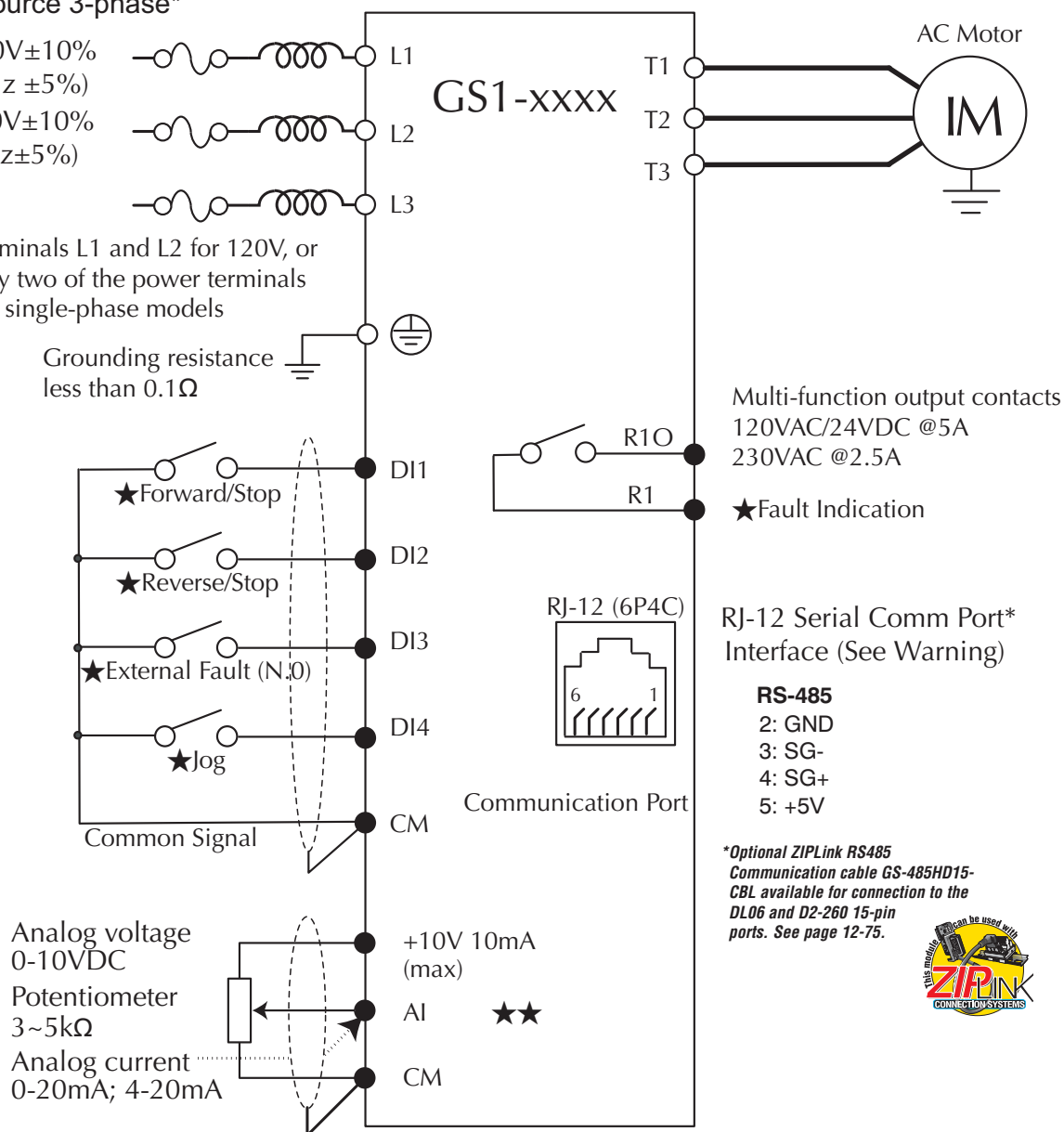
Note: Refer to the following pages for explanations and information regarding line reactors and RF filters: 12-50, 12-67.

Power Source 3-phase*

100-120V±10%
(50/60Hz ±5%)
200-240V±10%
(50/60Hz±5%)

* Use terminals L1 and L2 for 120V, or select any two of the power terminals for 240V single-phase models

Grounding resistance
less than 0.1Ω



★ Factory default setting

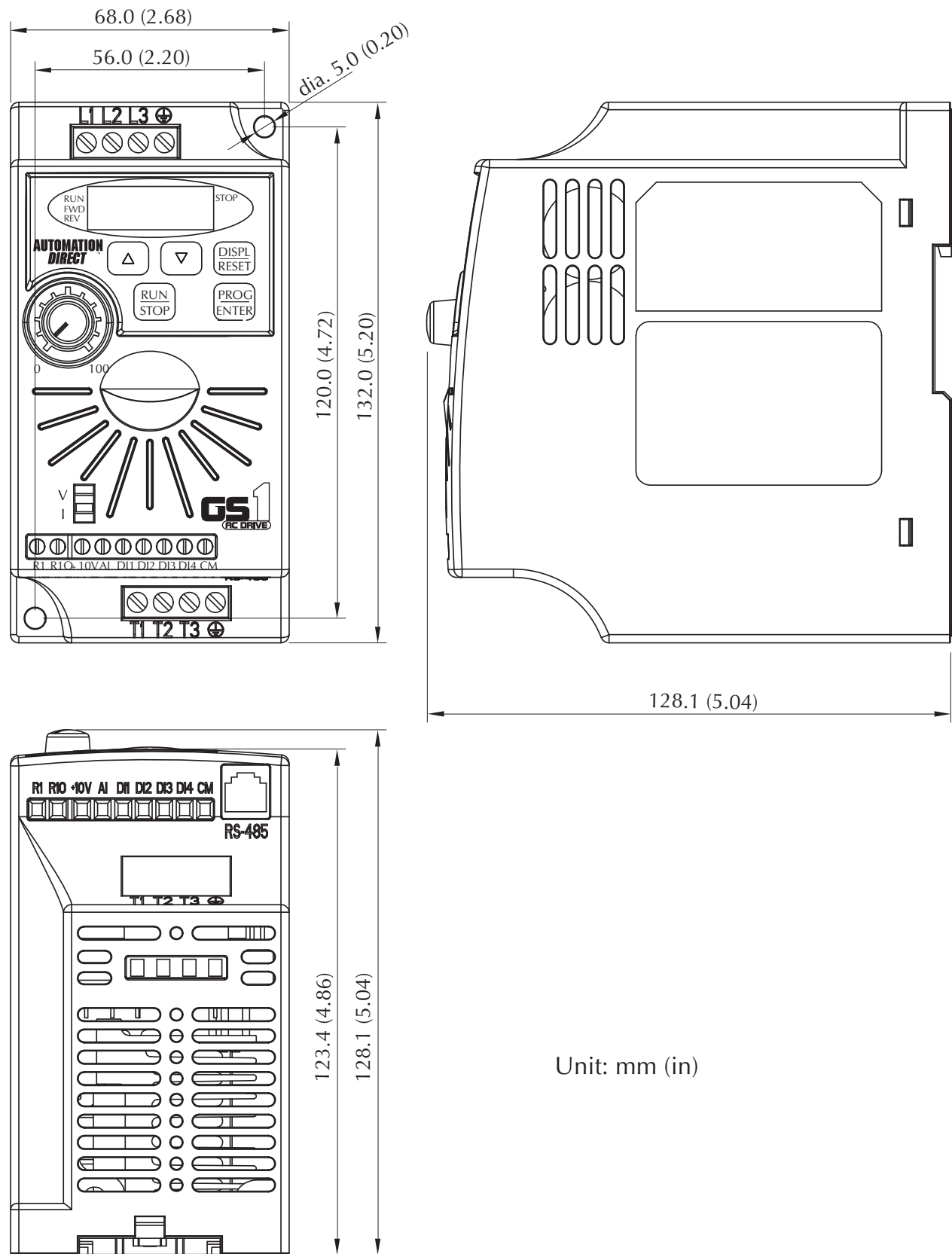
★★ Factory default source of frequency command is via the keypad potentiometer

○ Main circuit (power) terminals ● Control circuit terminal ⊕ Shielded leads



WARNING: Do not plug a modem or telephone into the GS1 RJ-12 Serial Comm Port, or permanent damage may result.
Terminals 2 and 5 should not be used as a power source for your communication connection.

GS1 Specifications - Dimensions



It is easier than you think to control the GS series and DURA PULSE drives from a DirectLOGIC or CLICK PLC when using Modbus RTU serial communications.

Step 1: Select a Drive

Using the chart below select the drive that fits your application needs.

Step 2: Select the Network/Protocol

Select the Network/Protocol that the drive uses.

Step 3: Select the PLC and Communication Port

Select the PLC and Communication port that works with the drive selected.

Step 4: Select a Cable

Select the cable (and adapter if needed) listed in the chart.

Note: If a PLC type or PLC port is not listed in the selection charts, it does not support Modbus RTU.

Step1	Step 3	CLICK	DL05	DL06	
		Port 2	Port 2	Port 1	Port 2
GS1	Step 2	Step 4			
		RS485 Modbus RTU	Not Possible	Not Possible	GS-485HD15-CBL
GS2	Step 2	RS232 Modbus RTU	Not Possible	GS-RJ12-CBL-2	Not Possible
		RS485 Modbus RTU	Not Possible	GS-RJ12-CBL-2	FA-15HD + GS-RJ12-CBL-2
DuraPulse	Step 2	RS485 Modbus RTU	Not Possible	GS-485HD15-CBL	Not Possible
		RS485 Modbus RTU	Not Possible	GS-485HD15-CBL	GS-485HD15-CBL

Step1	Step 3	D2-250-1	D2-260		D4-450
		Port 2	Port 1	Port 2	Port 3
GS1	Step 2	Step 4			
		RS485 Modbus RTU	Not Possible	Not Possible	GS-485HD15-CBL-2
GS2	Step 2	RS232 Modbus RTU	Not Possible	FA-15HD + GS-RJ12-CBL-2	Not Possible
		RS485 Modbus RTU	Not Possible	FA-15HD + GS-RJ12-CBL-2	FA-CABKIT + GS-RJ12-CBL-2
DuraPulse	Step 2	RS485 Modbus RTU	Not Possible	GS-485HD15-CBL-2	Not Possible
		RS485 Modbus RTU	Not Possible	GS-485HD15-CBL-2	Not Possible

ZIPLinks Connector Modules specifications begin on page 26-56

ZIPLinks Cables specifications begin on page 26-74



GS-RJ12-CBL-2



GS-485HD15-CBL-2



FA-15HD